

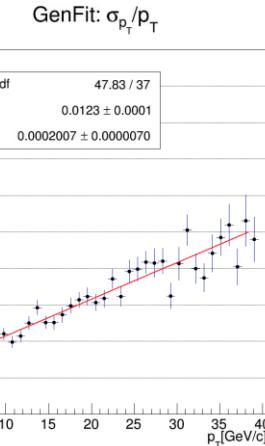
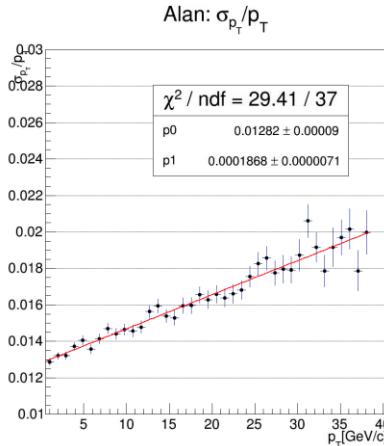
# Status of simulations and reconstruction

Jin Huang (BNL)

# Generic development: Recent highlights

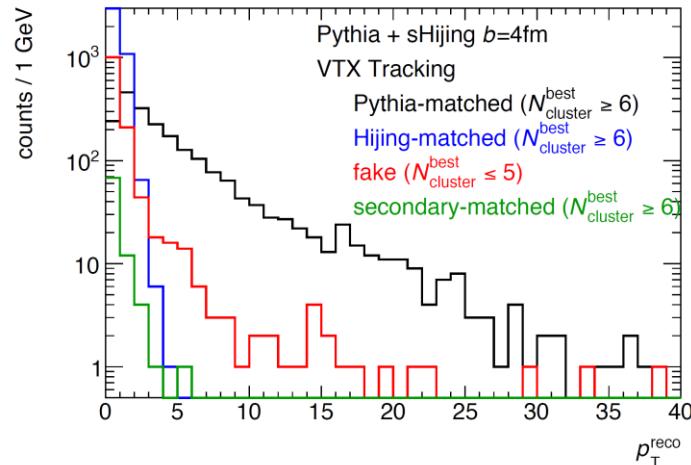
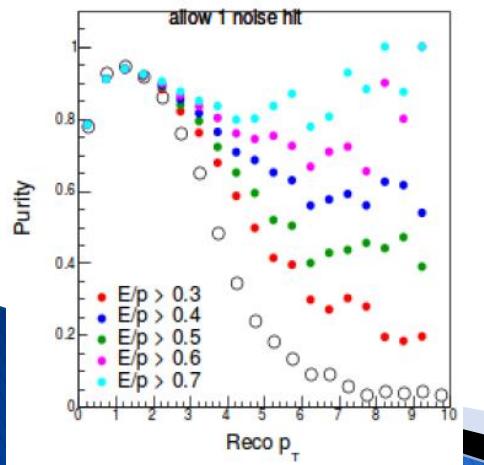
## Adopting GenFit Kalman filter package

(Haiwang Y., Chris P., Mike M.)



Track purity in G4 tracker (VTX) + fast calorimeter sim.

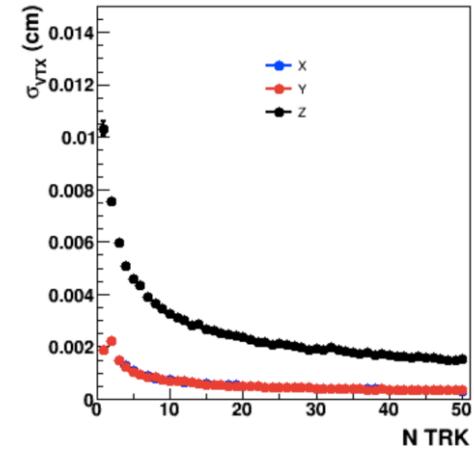
Inclusive track (Ron B./Kurt H.) , Track in jets (Dennis P.)



Jin Huang <jihuang@bnl.gov>

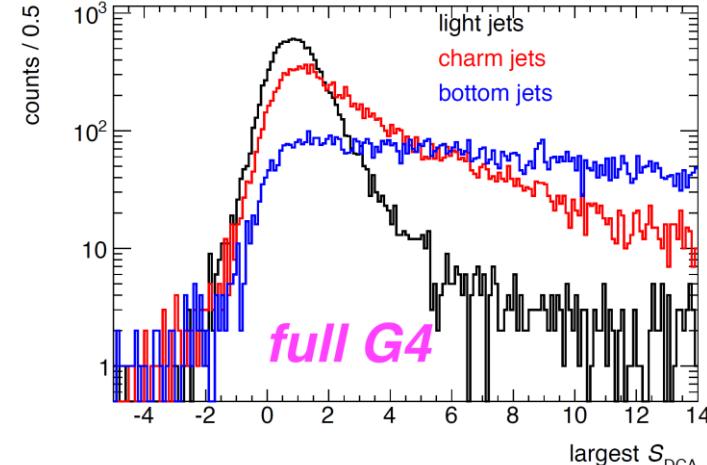
## RAVE vertex finding/fitting

(Sanghoon L., Haiwang Y.)



DCA-counting b-jet tagging in G4

(Dennis P.)

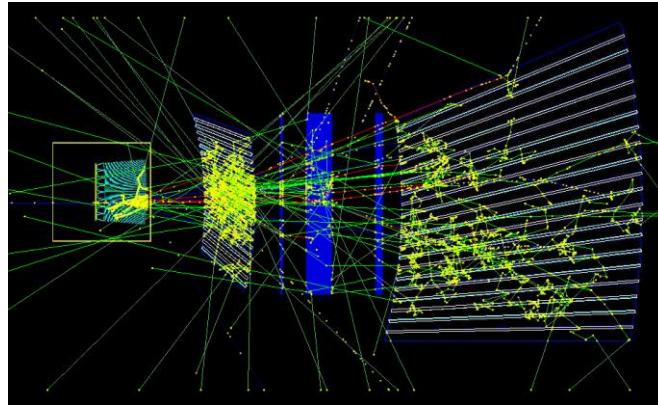


sPHENIX General Meeting

# Generic development: Test beam in action

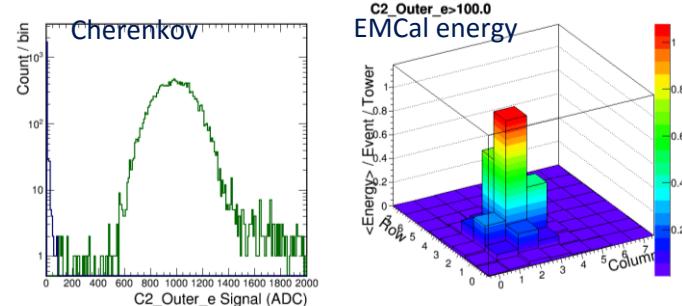
- ▶ Simulation  
(Chris P./Murad S./Jin H.)
  - One macro for everything: [https://github.com/sPHENIX-Collaboration/macros/blob/master/macros/prototype2/Fun4All\\_G4\\_Prototype2.C](https://github.com/sPHENIX-Collaboration/macros/blob/master/macros/prototype2/Fun4All_G4_Prototype2.C)
  - Quite comprehensive: Detailed geant4/Scintillation model/Photon fluctuation/digitization simulation
- ▶ Reconstruction  
(Abhisek S./Martin P./Jin H.)
  - Production in one macro: unpack and calibrate all channels/run info to DST  
[https://github.com/sPHENIX-Collaboration/macros/blob/master/macros/prototype2/Fun4All\\_TestBeam.C](https://github.com/sPHENIX-Collaboration/macros/blob/master/macros/prototype2/Fun4All_TestBeam.C)
  - Frequently reproduce all 800+ runs with newest code-base and calibration
  - Read more:  
[https://wiki.bnl.gov/sPHENIX/index.php/T-1044#Online\\_Production](https://wiki.bnl.gov/sPHENIX/index.php/T-1044#Online_Production)
- ▶ Analysis  
(Vera L./Abhisek S./Mike S./Ron B./Megan C./Jin H. and many others)
  - See analysis note writing in action:  
[https://wiki.bnl.gov/sPHENIX/index.php/T-1044#Run\\_info](https://wiki.bnl.gov/sPHENIX/index.php/T-1044#Run_info)

Simulation: event display  
<https://github.com/sPHENIX-Collaboration/macros/pull/22>



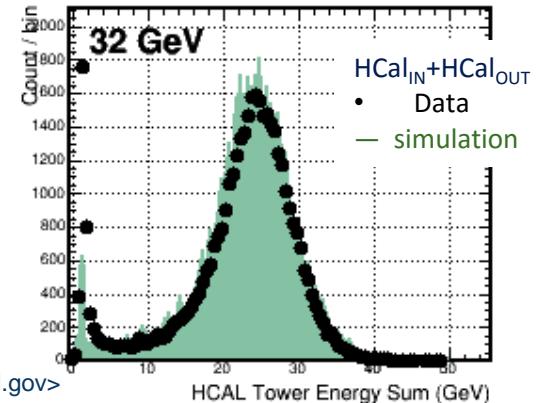
Production: QA plots

[https://wiki.bnl.gov/sPHENIX/index.php/T-1044/joint\\_data\\_good\\_run\\_note](https://wiki.bnl.gov/sPHENIX/index.php/T-1044/joint_data_good_run_note)



Analysis: data VS sim.

[https://wiki.bnl.gov/sPHENIX/index.php/T-1044/HCAL\\_good\\_run\\_note](https://wiki.bnl.gov/sPHENIX/index.php/T-1044/HCAL_good_run_note)



# Response to charge: simulation preparations

- ▶ Calorimeter production
  - Chris is running default simulation setup to exercise production/analysis machinery
  - Memory+CPU use issue in running full HIJING sample with absorber + truth tracing. Chris [working](#) on reducing memory use.
  - Next to try: not to save absorber hits for HIJING
- ▶ TPC simulation
  - Alan D. and Mike M. [working](#) on improving CPU-cost in running TPC simulation
  - Thread: <https://github.com/sPHENIX-Collaboration/coresoftware/pull/144>
- ▶ Inner HCal
  - John L. and Chris. P. implemented inner HCal with flat plates as default
  - Minimal impact to performance, more realistic in cost-benifit
  - Thread: <https://github.com/sPHENIX-Collaboration/coresoftware/pull/142>

# Response to charge: Common reconstruction software preparations

- ▶ Kurt H.: Fast simulation production with EMCAL for fake track rejection
- ▶ Jin H: Electron ID after 2x2 Gang (by reusing large embedded pre-CDR simulation sample)
- ▶ Jin H: EMCAL towerizing module for 2x2 Ganging (then useable in jet reco)

# Response to charge: Message to Topical Groups

- ▶ Please communicate your simulation need for the charge, so we could help plan best route for coming one-two weeks
- ▶ Expect many update/discussion in the next simulation meeting (Tue 1PM EST)

# Next ... And always

- ▶ As mentioned in Gunthers' talk, review and charges will come perpetually, that require us the build machinery to generate performance plots semi-automatically
  - We already came a long way: framework, detailed calorimetry simulation, jet finding, etc.
  - Further work on realistic tracking, fast simulator on-going
- ▶ Need to work with TGs to build **analysis machinery** to perform analysis in a reliable and stable way
- ▶ Lots of opportunity for new collaborator to contribute

# To new collaborators: How to get started in sPHENIX software

- ▶ Discussion group:
  - sPHENIX simulation meeting: <https://indico.bnl.gov/categoryDisplay.py?categoryId=88>
  - Software and repository email list:
    - <https://lists.bnl.gov/mailman/listinfo/sphenix-software-l>
    - <https://lists.bnl.gov/mailman/listinfo/sphenix-github-l>
- ▶ Documentation
  - Software wiki: <https://wiki.bnl.gov/sPHENIX/index.php/Software>
    - Always good to start with [day-1 checklist](#)
    - Please search your email for read password/open writable account registration with Dr. John Haggerty
  - Doxygen software reference:  
<https://www.phenix.bnl.gov/WWW/sPHENIX/doxygen/html/>
- ▶ Resource
  - RCAF
    - Expect to work with both PHENIX and STAR(in testing) existing RCF account
    - 100 TB (user) base disk and expanding (in testing with the new sphenix group ID)
  - sPHENIX code repository: <https://github.com/sPHENIX-Collaboration>